

DETAILED ACTION

Applicant's arguments filed 7/24/11 have been fully considered but they are not persuasive. See discussion below. Previous rejections not addressed below are withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8,17,18,20,21,23,24,34-37,40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (WO 00/04778; 2/3/00) in view of Blouin (EP 427094 A1; 5/15/91) or Nonomura (WO 01/56384 A1; 8/9/01). Smith et al. teach a method for promoting the germination of seed and/or seedling emergence and/or the growth plants (e.g. legumes and non-legumes) comprising subjecting the plants to an effective amount of an agricultural composition comprising 10⁻⁵ to 10⁻¹⁴ M Lipo chitooligosaccharide (LCO) and carrier. See abstract, page 4 lines 21-28, page 7 lines 11-29, page 11 line 11- page 12 line 25, page 16 lines 1-8 and Examples 4-6. The application of a plant to LCOs would include contacting the whole plant (foliage and stem) with the LCOs. Smith at page 4 line 20 – page 5 and page 7 lines 3-18 teaches that plants of non-legume plant families such as Poaceae, Malvaceae, Chenopodiaceae, Brassicaceae and Solonaceae (tomatoes) are treated with LCOs. Since both instant invention and Smith teach the same active step of

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applying LCOs to the plants, it is natural that both inventions will yield the same result, i.e. the flowering and fruiting of non-legume plants. Smith et al. do teach that LCO is present in an amount to increase flower or fruit number in four weeks after application. Smith et al. also do not teach the administration of the ng amount of LCO to the plant or the treatment of tomato plants with LCO. In the absence of unexpected results for the claim concentration range, it is well within the skill of an artisan in the field to determine the optimum concentration. One would have been motivated to do this in order to gain proper and healthy maturation of the plant. One would have been expected to treat tomato plants with LCO since the tomato plants are species in the Solonaceae plant genus. Smith et al. do not teach LCO being applied to plants in multiple applications. Blouin and Nonomura teach agrochemicals can be applied to plants in multiple applications. See Blouin claims and Nonomura page 18 lines 19-31. It would have been obvious to modify the invention to include multiple applications LCO to plants. One would have been motivated to do this in order to enhance the growth of the plants.

Applicants argue that in Table 2, a first dose of LCO was applied after plants were seeded and a second dose of LCO was applied 46 days later. Applicants argue that Smith '778, Smith '465, Prithiviraj, Blouin and Nonomura fail to disclose the limitations of the claimed invention. Smith '778 Examples 11-13 disclose that seeds are pretreated with LCO or pots are irrigated with LCO at the time the seeds are planted in Example 4. The Examiner maintains that it is obvious that multiple dose applications of LCO would render a better yield of fruit. With respect to the application timing of the LCO dose, no data are provided as evidence that the timing of application of LCO in the

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instant invention would give unexpected results over the timing of the application of the LCO dose in Smith. The Examiner argues that Applicants provide no evidence that the time of LCO application provides unexpected results over Smith '778. Applicants agree that Smith et al. do not teach a composition for increasing early flowering wherein the LCO concentration is effective in increasing flowering and fruiting of a plant over a four week period. In composition claim 7 this is a statement to intended use, and thus, carries no patentable sufficient. Note, Smith method promotes the growth of plants by applying LPO; therefore the LCO used in Smith et al. would increase flowering and fruiting. Applicants argue that WO '778 at page 13 teaches seed treatment of nonlegume plants with LCO rather than foliage application of LCO as instantly claimed. The Applicants make these arguments to support that the LCO enclosed in WO '778 is not applied to seedling or foliage. However, the Examiner argues that WO '778 at page 5 in last paragraph and claim 22 disclose treating plants (seedlings) with LCO. This teaching discloses that LCO is applied to the whole plant or seedling which would include the foliage thereof.

The Applicants argue that Smith does not disclose or suggest an effect of LCOs on the flowering, fruiting or yield in nonleguminous plants. The Applicant argues that WO '778 discloses the effect of LCO seed treatment on germination of seeds and seedling emergence and growth in leguminous plants. WO '778 does not teach foliar treatment of any nonleguminous plant. The Examiner argues that Smith at page 4 line 20 – page 5 and page 7 lines 3-18 teaches that plants of non-legume plant families such as Poaceae, Malvaceae, Chenopodiaceae, Brassicaceae and Solonaceae are

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treated with LCOs. WO '778 does not explicitly state that LCO is applied to plant foliage. However, WO '778 does state the plants and crop are treated with LCO. From such a statement, it can be deduced that LCO is applied to the total plant including the plant's foliage. The Examiner reiterates that both instant invention and Smith teach the same active step of applying LCOs to the plants, it is inherent that both inventions will yield the same result, i.e. the flowering and fruiting of non-legume plants. Thus, the results in paragraphs 52 and 53 of the specification are made obvious by Smith et al.

Claims 8,17,18,20,21,23,24,34-37,40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (WO 01/26465; 4/19/01) in view of Blouin (EP 427094 A1; 5/15/91) or Nonomura (WO 01/56384 A1; 8/9/01). Smith et al. teach a method for increasing photosynthesis and/or yield plants (e.g. legumes and non-legumes) comprising exposing the plant leaves to an effective amount of an agricultural composition comprising 10^{-5} to 10^{-14} M Lipo chito-oligosaccharide (LCO) plus carrier. See abstract, page 5 line 20 – page 7 line 24, page 10 lines 4-10, page 15 lines 9-23, page 18 line 3 – page 19 line 7, Examples 3,5,6 and table 3,6. The exposure of a plant to LCOs would include contacting the whole plant (foliage and stem) with the LCOs. Smith at page 4 line 20 – page 5 and page 7, page 6 lines 3-13, page 7 lines 10-24, and page 8 line 2 – page 9 line 13 teaches that plants of non-legume plant families such as Poaceae, Malvaceae, Chenopodiaceae, Brassicaceae and Solonaceae are treated with LCOs. The Examiner reiterates that both instant invention and Smith teach the same active step of applying LCOs to the plants, it is inherent that both inventions will yield the same result, i.e. the flowering and

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fruiting of non-legume plants. Thus, the results in paragraphs 52 and 53 of the specification are made obvious by Smith et al. Smith et al. do teach that LCO is present in an amount to increase flower or fruit number in four weeks after application. Smith et al. also do not teach the administration of the ng amount of LCO to the plant or the treatment of tomato plants with LCO. In the absence of unexpected results for the claim concentration range, it is well within the skill of an artisan in the field to determine the optimum concentration of LCO to apply to the plant. Note, at page 6 line 3 - page 8 line 9, Smith et al. suggest that LCO is applied to the plant. One would have been motivated to do this in order to gain proper and healthy maturation of the plant. Smith et al. do not teach LCO being applied to plants in multiple applications. Blouin and Nonomura teach agrochemicals can be applied to plants in multiple applications. See Blouin claims and Nonomura page 18 lines 19-31. It would have been obvious to modify the invention to include multiple applications LCO to plants. One would have been motivated to do this in order to enhance the growth of the plants.

Applicants argue that Examples 2 and 3 in Smith '465 and Smith '465 fail to teach the application of a first dose of LCO "more than 45 days after seeding" followed by the application of a second dose LCO as recited in the instant claims. The Examiner maintains that it is obvious that multiple dose applications of LCO would render a better yield of fruit. With respect to the application timing of the LCO dose, no data are provided as evidence that the timing of application of LCO in the instant invention would give unexpected results over the timing of the application of the LCO dose in Smith.

Applicants agree that Smith et al. do not teach a composition for increasing early

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flowering wherein the LCO concentration is effective in increasing flowering and fruiting of a plant over a four week period. In composition claim 7 this is a statement to intended use, and thus, carries no patentable sufficient. Note, Smith method increase photosynthesis and/or yields plants by exposing plants to LPO; therefore the LCO used in Smith et al. would increase flowering and fruiting. Applicant argue that '465 teach spray containing LCO was applied to plants when plants were large enough to allow easy leaf measurement (p. 21 lines 22-24). The Examiner concurs that '465 discloses that LCO is applied to plant leaf. The Applicants argue that Smith does not disclose or suggest an effect of LCOs on the flowering, fruiting or yield in nonleguminous plants. The Examiner argues that Smith at page 4 line 20 – page 5 and page 7, page 6 lines 3-13, page 7 lines 10-24, and page 8 line 2 – page 9 line 13 teaches that plants of non-legume plant families such as Poaceae, Malvaceae, Chenopodiaceae, Brassicaceae and Solonaceae are treated with LCOs. Since both instant invention and Smith teach the same active step of applying LCOs to the plants, it is inherent that both inventions will yield the same result, i.e. the flowering and fruiting of non-legume plants.

Claims 8,18,20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prithiviraj. (A host specific bacteria-to-plant signal molecule (Nod factor) enhances germination and early growth of diverse crops, Planta, 2003, vol. 216, pp. 437-445). Prithiviraj teaches a method enhancing germination and early growth of plants (e.g. legumes) comprising applying to the plants to an effective amount of an agricultural composition comprising Lipo chitooligosaccharide (LCO). See abstract and p. 440. The application of a plant to LCOs would include contacting the whole plant (foliage and

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stem) with the LCOs. Prithiviraj does not state that plants are harvested or that harvesting resulted in a yield increase. However, it is inherent that plants such as legumes would be harvested. It is also inherent that instant method of harvesting results in an increased yield since both Prithiviraj and instant claims disclose the same active step of applying LCO to plants. Prithiviraj do not teach that LCO is present in an amount to increase flower or fruit number in four weeks after application. Prithiviraj also does not teach the administration of the ng amount of LCO to the plant or the treatment of tomato plants with LCO. In the absence of unexpected results for the claim concentration range, it is well within the skill of an artisan in the field to determine the optimum concentration. One would have been motivated to do this in order to gain proper and healthy maturation of the plant. One would have been expected to treat tomato plants with LCO since the tomato plants are species in the Solonaceae plant genus. Smith et al. do not teach LCO being applied to plants in multiple applications. Blouin and Nonomura teach agrochemicals can be applied to plants in multiple applications. See Blouin claims and Nonomura page 18 lines 19-31. It would have been obvious to modify the invention to include multiple applications LCO to plants. One would have been motivated to do this in order to enhance the growth of the plants.

Applicants argue that Prithiviraj fails to teach the application of a first dose of LCO “more than 45 days after seeding” followed by the application of a second dose of LCO as recited in the instant claims. The Examiner maintains that it is obvious that multiple dose applications of LCO would render a better yield of fruit. With respect to the application timing of the LCO doses, no data are provided as evidence that the timing of

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application of LCO in the instant invention would give unexpected results over the timing of the application of the LCO dose in Smith. Applicants argue that Blouin and Nonomura contribute to the synthesis and growth of plant tissue by incorporating the applied materials. On the other hand, the claimed LCOs act as signal molecules which do not function as substrates for the generation of plant tissue, but instead function by activating natural plant genes. The Examiner maintains that Blouin and Nonomura are solely used to show agrochemicals can be applied in multiple doses. Blouin and Nonomura teach agrochemicals can be applied to plants in multiple applications. See Blouin claims and Nonomura page 18 lines 19-31. It would have been obvious to modify the invention to include multiple applications LCO to plants since LCO is an agrochemical. One would have been motivated to do this in order to enhance the growth of the plants.

Telephonic Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALTON N. PRYOR whose telephone number is (571)272-0621. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Alton N. Pryor/
Primary Examiner, Art Unit 1616